On Invited Inferences

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1. Conditional Perfection. When confronted with sentences like

(1) If John leans out of that window any further, he'll fall.

students in elementary logic courses often propose that the examples are to be formalized with biconditionals rather than conditionals--that is, that (1) is to be formalized as the conjunction o

(2) $L \supset F$

and

(3) $\sim L \supset \sim F$

rather than (2) alone. The proposal is surely wrong: proposition (2) could be true and (3) false if John were not to lean out of the window any further but were to fall as the result of losing his grip or being hit by a gust of wind, etc.

What is right about the novice logician's proposal is that in a wide variety of circumstances, sentences having the logical form of (2) are interpreted, by many speakers, at least, as if they imply the truth of (3). For example, many speakers would take someone who says (4) to have committed himself to the truth of (6) as well as (5).

(4) If you mow the lawn, I'll give you five dollars.
(5) $M \supset G$
(6) $\sim M \supset \sim G$

Certainly, given our attitudes toward the exchange of money in our society, one would have some warrant for assuming that if someone says (4) he will act as if he intended both (5) and (6). Let us say that (4) promises (5) and invites the inference of, or suggests, (6).

In many cases, including those above, there is a quasi-regular association between the logical form of a sentence and the form of the inferences it invites. A general statement of the principle at work in the present case is

(7) A sentence of the form $X \supset Y$ invites an inference of the form $\sim X \supset \sim Y$.

Principle (7) asserts a connection between linguistic form and a tendency of the human mind--a tendency to 'perfect conditionals to biconditionals', in words suggested to us by Lauri Karttunen. This tendency is manifested in two classical logical fallacies, Affirming the Consequent (concluding X from $X \supset Y$ and Y) and Denying the Antecedent (concluding $\sim Y$ from $X \supset Y$ and $\sim X$), as well as in cases like (1) and (4). The great popularity of these fallacies and the ease with which principle (7) can confound the linguist investigating the semantics of conditional sentences indicate the strength of this tendency. Hereafter we refer to principle (7) as Conditional Perfection (CP).

2. Extent of CP. We have seen that CP is operative in the case of predictions (cf. (1) above) and in promises (cf. (4) above). It also applies in the case of threats, law-like statements, commands, and counterfactual conditionals. An instance of a conditional threat:

(8) If you disturb me tonight, I won't let you go to the movies tomorrow.

which suggests that good behavior will be rewarded. An instance of a law-like statement:

(9) If you heat iron in a fire, it turns red.

which suggests that cold iron is not red. An instance of a conditional command

(10) If you see a white panther, shout "Wasserstoff" three times.

which suggests silence in the absence of white panthers. An instance of a counterfactual conditional that is not superficially marked as such is

(11) If Chicago is in Indiana, I'm the Queen of Rumania.

which suggests (although it does not imply) that if Chicago turns out not to be in Indiana, then the speaker of (11) is indeed not the Queen of Rumania.

A striking case of CP involves marked counterfactual conditionals, as in

(12) If Andrew were here, Barbara would be happy.

It is natural to suppose that both the antecedent and consequent are presupposed to be false, that is that (12) presupposes that Andrew is not here and that Barbara is unhappy. But, as Karttunen observes in a squib to appear in Linguistic Inquiry, only the antecedent is presupposed false; the falsity of the consequent is merely suggested, not presupposed. What is so interesting about

this example is that it illustrates the degree to which CP can mislead the analyst.

3. Inclusive OR. The English or is in many contexts unspecified as to its inclusive or exclusive sense. In

(13) Give it to a friend or a colleague.

the possibility that the recipient be both a friend and a colleague is not barred, nor is it (in our opinion) specifically condoned. Quite often the favored interpretation is exclusive, as in

(14) Martin will play a blues number or dance a jig.

But in at least one context, the antecedent clause of a conditional or is normally understood by many speakers to be inclusive. Thus,

(15) If Martin plays a blues number or dances a jig, I'll imitate a porcupine.

suggests

(16) If Martin plays a blues number and dances a jig, I'll imitate a porcupine.

but does not imply it, as can be seen from the acceptability of

(17) If Martin plays a blues number or dances a jig, I'll imitate a porcupine, but if he does both, I won't do a thing.

The general principle (which is undoubtedly too specific and requires much further investigation) is of the form

(18) A sentence of the form (X OR Y) $\supset$ Z invites the inference (X AND Y) $\supset$ Z.

4. Inferred Causation. We mention here briefly a final class of invited inferences. Sentences which express a temporal sequence of situations, for example,

(19) After a large meal, we slept soundly.
(20) Having finished the manuscript, she fell into a swoon.
(21) Martha observed the children at play and smiled with pleasure.

invite the inference that the first situation is a cause of or reason for the second. It is clear that the relationship is one of suggestion, not implication; indeed, this principle of inference corresponds to the familiar fallacy Post Hoc Ergo Propter Hoc (just as CP has its related fallacies).

5. Prospectus. Beyond the tasks of collecting principles of invited inference, of making precise statements of them, and of classifying them--not unimportant tasks, inasmuch as invited inferences are a species of underbrush that must be cleared before investigations of semantics can thrive--there are several difficult and rather deep problems. To what extent are invited inferences regularly associated with the semantic content of a sentence? To what extent (if any) do invited inferences determine syntactic form?

The discussion of section 1 indicates that the association of inferences with semantic content can be highly regular, and this observation is supported by the fact that sentences which are conditional in meaning but not in form are subject to CP. Thus

(22) After a large meal, he sleeps soundly.

invites the inference that his sleep is troubled after moderate eating, presumably because (22) has a semantic representation close to that of

(23) If he has a large meal, then after it he sleeps soundly.

Similarly,

(24) Dogs that eat Opla are healthy.

suggests

(25) Dogs that are healthy eat Opla.

presumably because (24) has a semantic representation substantially like that of

(26) If a dog eats Opla, then it is healthy.

It seems, then, that what we have called 'invited inferences' constitute a special class of 'implicatures', in the terminology of the philosopher H. Paul Grice (in some very important but not yet published work), although they are clearly distinct from the 'conversational implicatures' which are his principal concern. Grice considers what interpretation will be placed upon an utterance in a particular context; he looks for general principles governing the effects that utterances have, principles associated with the nature of the speech act itself. CP is, in some sense, a principle governing the effects that utterances have--conditionals are understood to be perfected unless the hearer has reason to believe that the converse is false--but it is in no way that we can see derivable from considerations having to do with the nature of the speech act. In the case of Inferred Causation, it is at least possible to imagine that a Gricean axiom is the explanation of the principle of invited inference. But, we think, closer examination dashes these hopes. Consider, for example, (22) in light of

Grice's relevance principle ("Be relevant"), which might be supposed to provide some account of the fact that (22) suggests a causal connection between two events. But the sentence asserts a connection between two events--a temporal connection--so why should people tend to assume a further relevance? And even if the relevance principle can somehow be made to cover this case, why is the relevance assumed to be a matter of causation, and not some other sort of association between events? We must conclude that these facts do not lend themselves so easily to explanations of the Gricean sort.

As for the association of invited inferences with syntactic form, we have no evidence of direct relationship, although we would not rule out the possibility. Certainly, it seems to be the case that an invited inference can, historically, become part of semantic representation in the strict sense; thus, the development of the English conjunction since from a purely temporal word to a marker of causation can be interpreted as a change from a principle of invited inference associated with since (by virtue of its temporal meaning) to a piece of the semantic content of since.

Footnote

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